TIII:

Schmitt Trigger

Unclassified

2 Hour Conference, W/ 2 Hr PE1

Safety & Environmental Impact is “LOW”

TIII: Schmitt Trigger

Terminal Learning Objective

ACTION:

Given schematic diagrams & Ckt operational concepts of the Schmitt Trigger answer all Questions.

CONDITION: W/O Reference.

STANDARD: A minimum accuracy of 70%.

Introduction

When Signals are transmitted they will inherently pick up extraneous noise or become distorted, hence the need for a Ckt that can correct those deficiencies.

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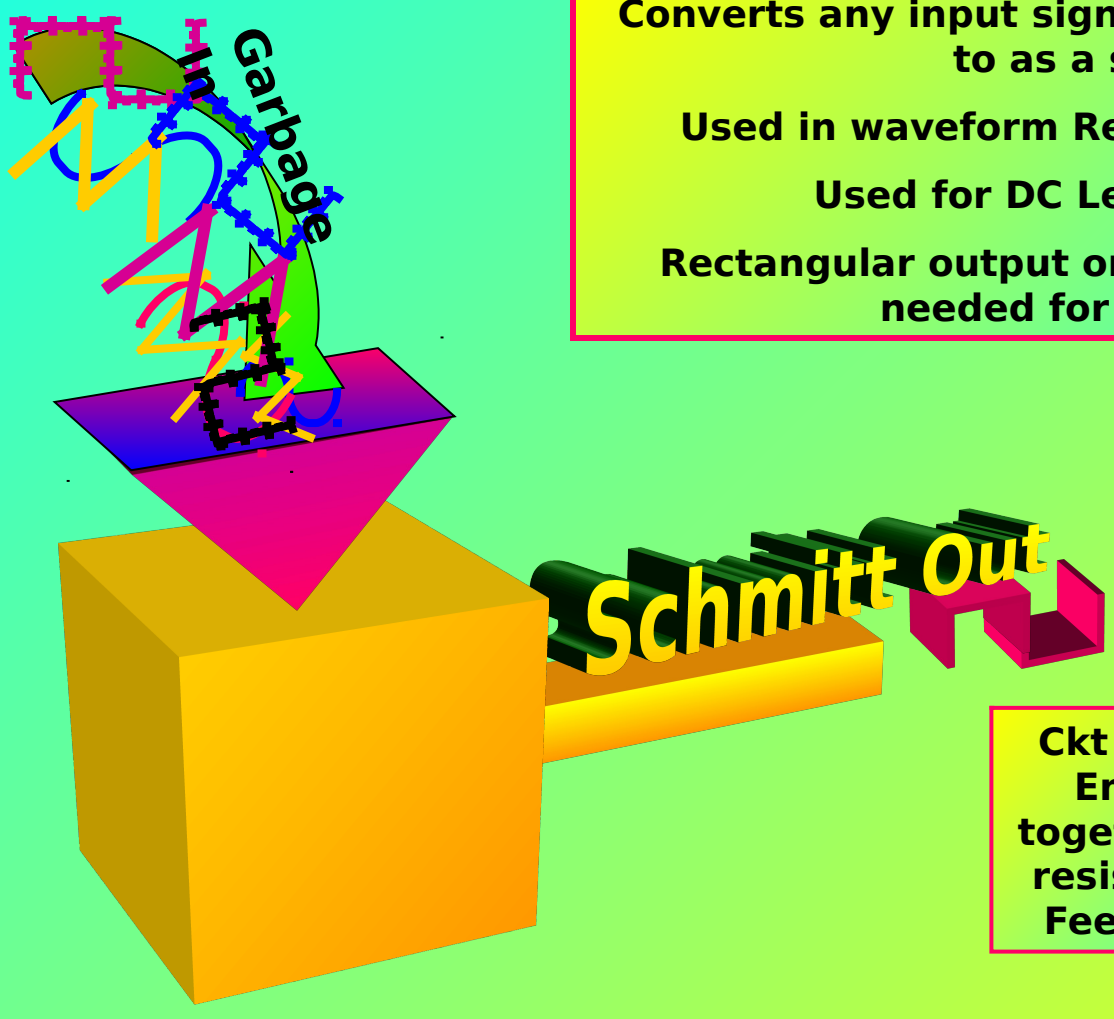
Schmitt Trigger Features;

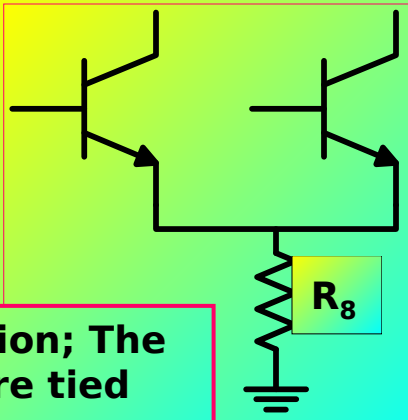


Converts any input signal to a Squarewave, referred to as a squaring Ckt.

Used in waveform Restoration or Reformation.

Used for DC Level detection. [R2].

Rectangular output on the sharp leading edge is needed for precious timing.



Ckt recognition; The Emitters are tied together to a common resistor R8, {Emitter Feedback resistor}.

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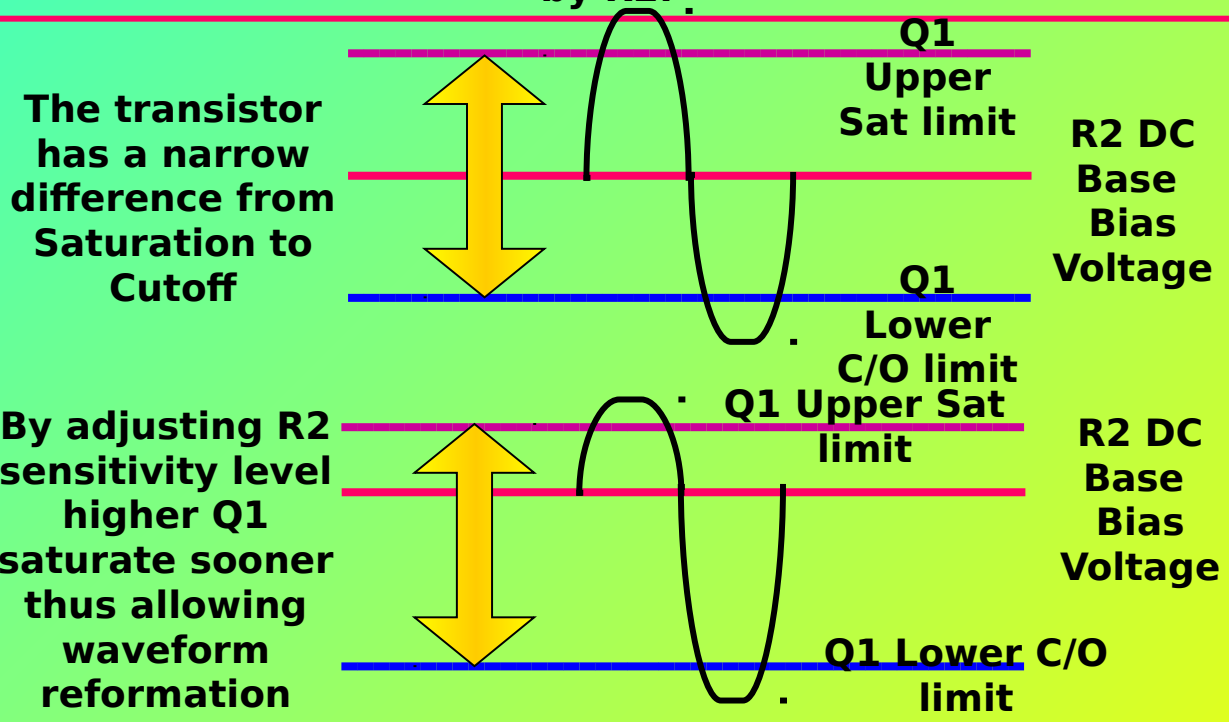
Schmitt Trigger Features; R2 DC level Detection.

Q1 & Q2 operates in extreme opposite states of conduction.

Q1 Saturated, Q2 in Cutoff, is the Static State, it remains in the static state until it is triggered by an external signal.

The time constant [TC] is dependent upon the DC level detection set by R2.


The transistor has a narrow difference from Saturation to Cutoff
Q1 Upper Sat limit
R2 DC Base Bias Voltage
Q1 Lower C/O limit
By adjusting R2 sensitivity level higher Q1 saturate sooner thus allowing waveform reformation
Q1 Upper Sat limit
R2 DC Base Bias Voltage
Q1 Lower C/O limit

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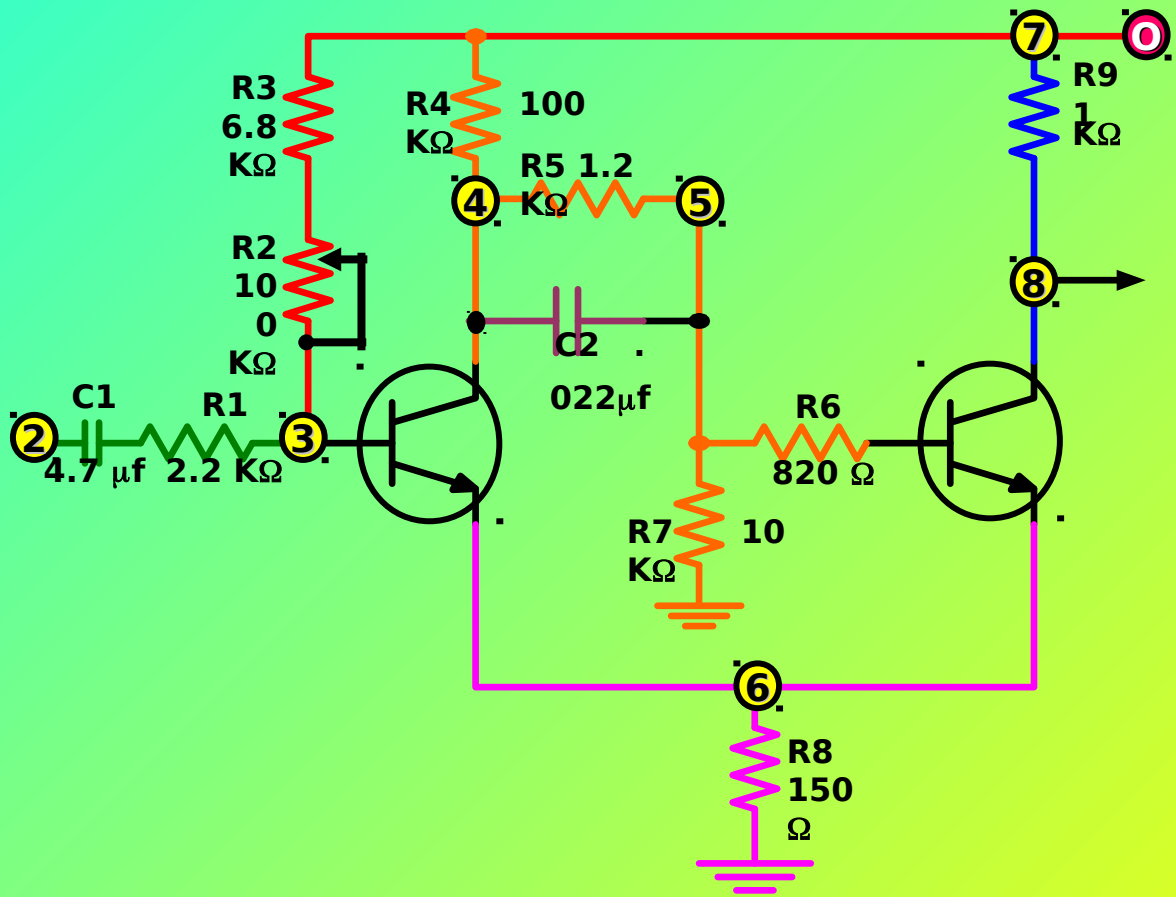
PC42; Component ID.



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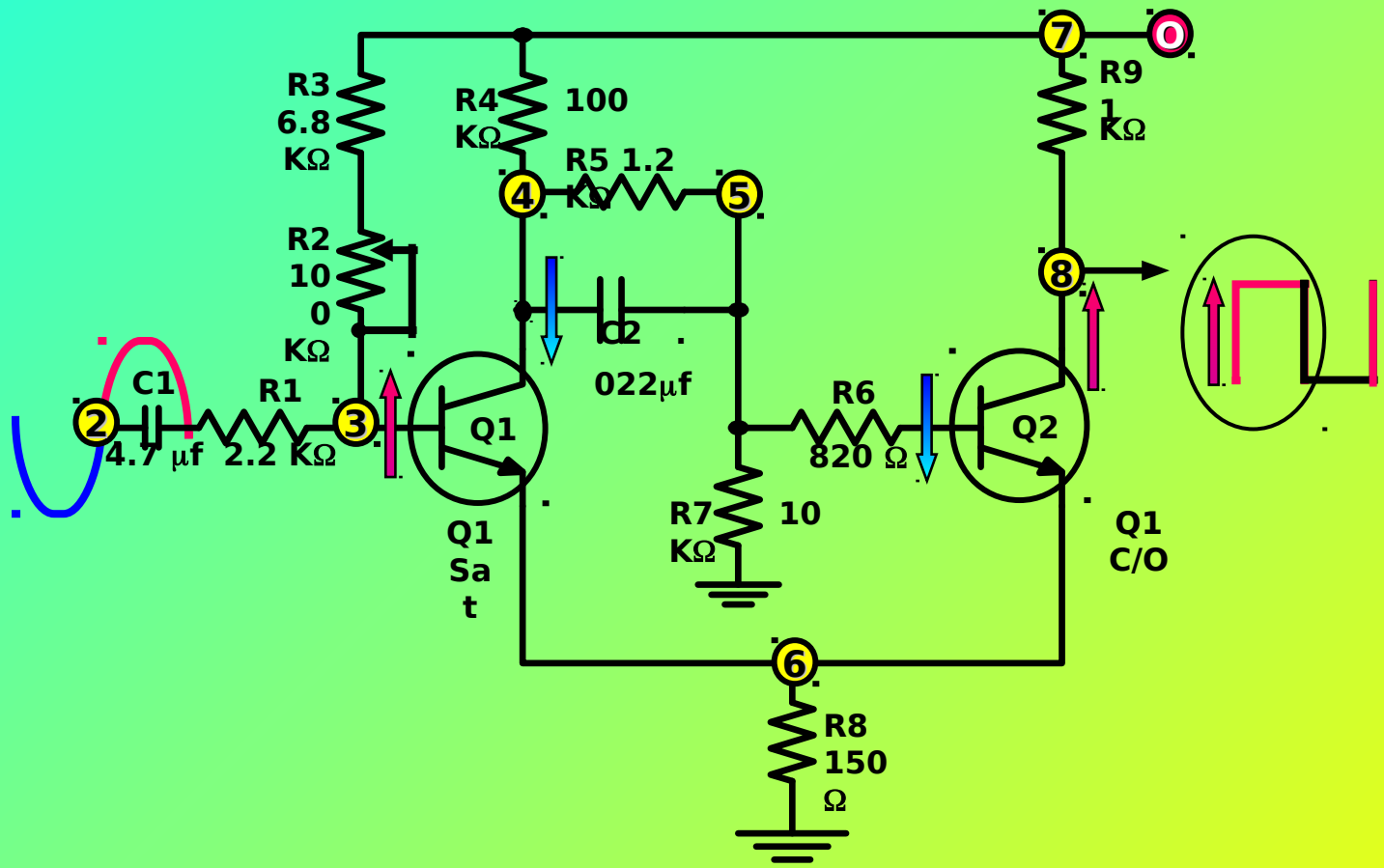
PC42; Ckt Operation, Static Mode & Positive Trigger.



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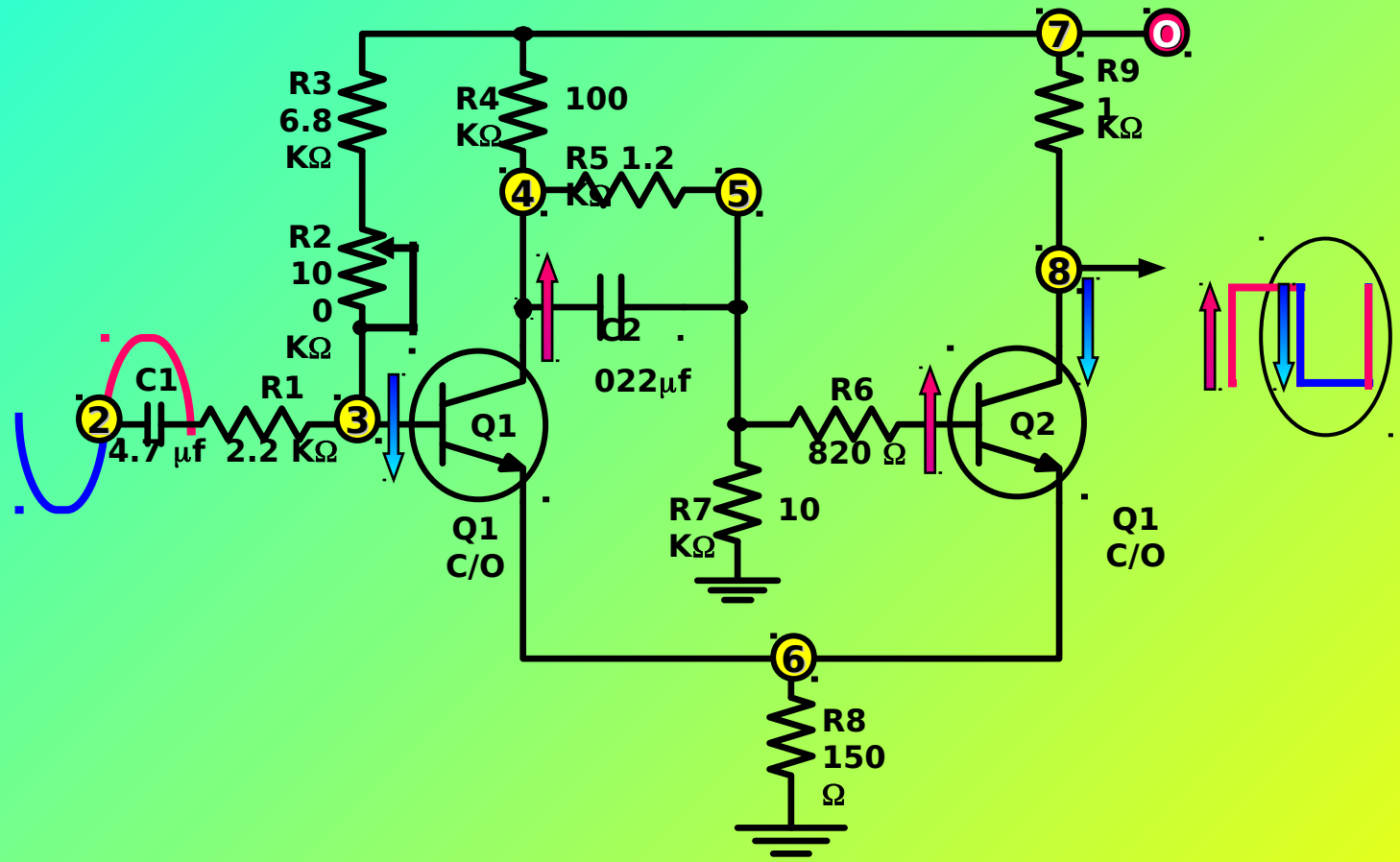
PC42; Ckt Operation, Negative Trigger.



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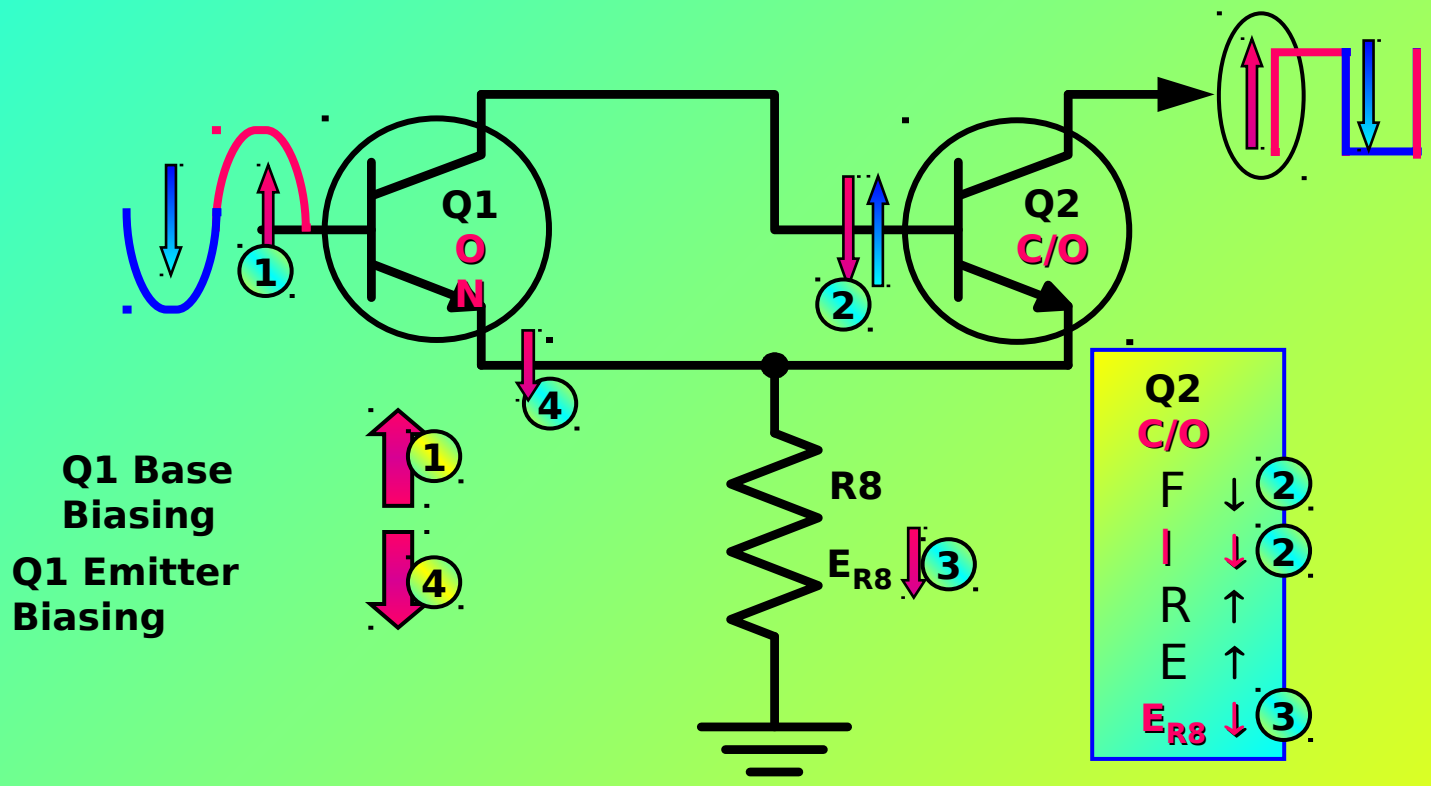
PC42; Ckt Operation, Biasing, Q2 dictates a quick change of conduction.



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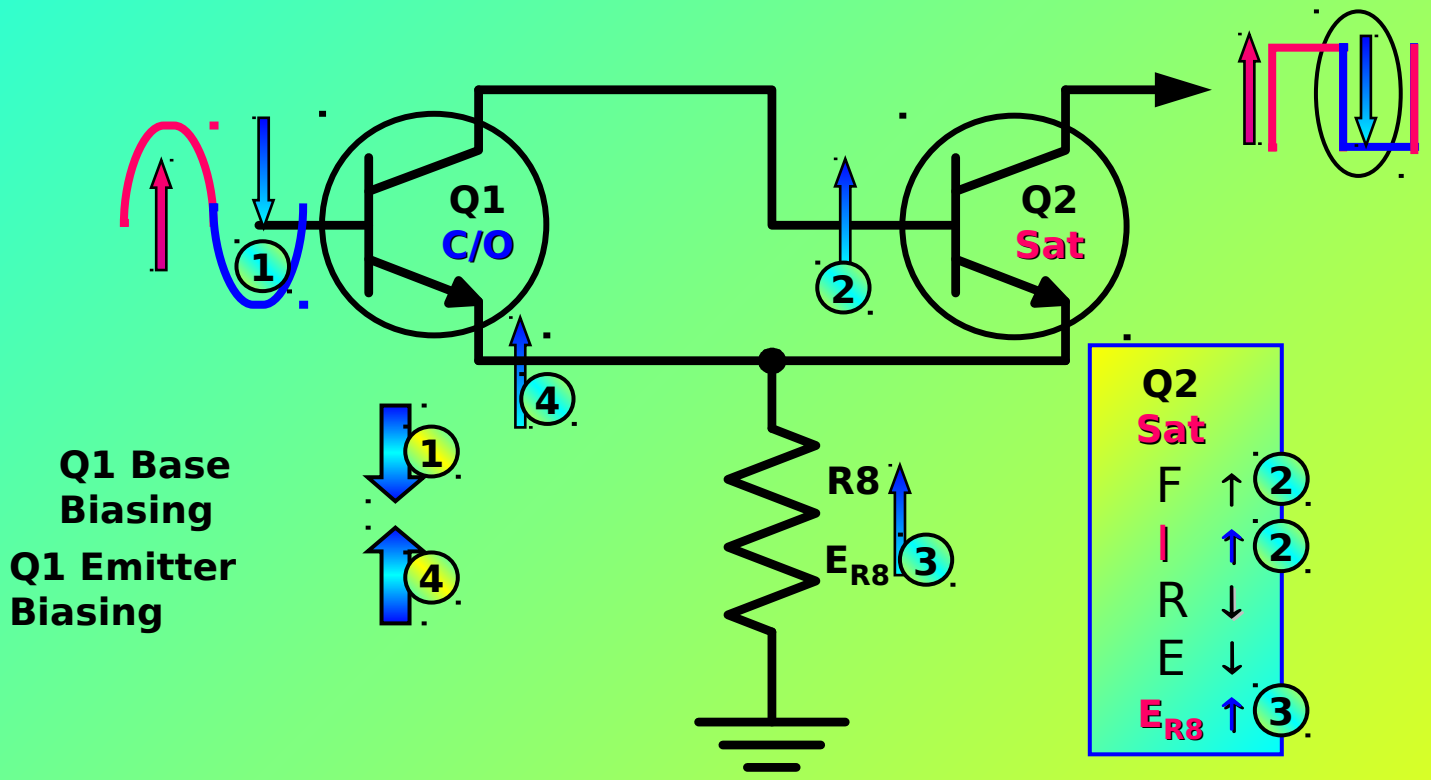
PC42; Ckt Operation, Biasing, Q2 dictates a quick change of conduction.



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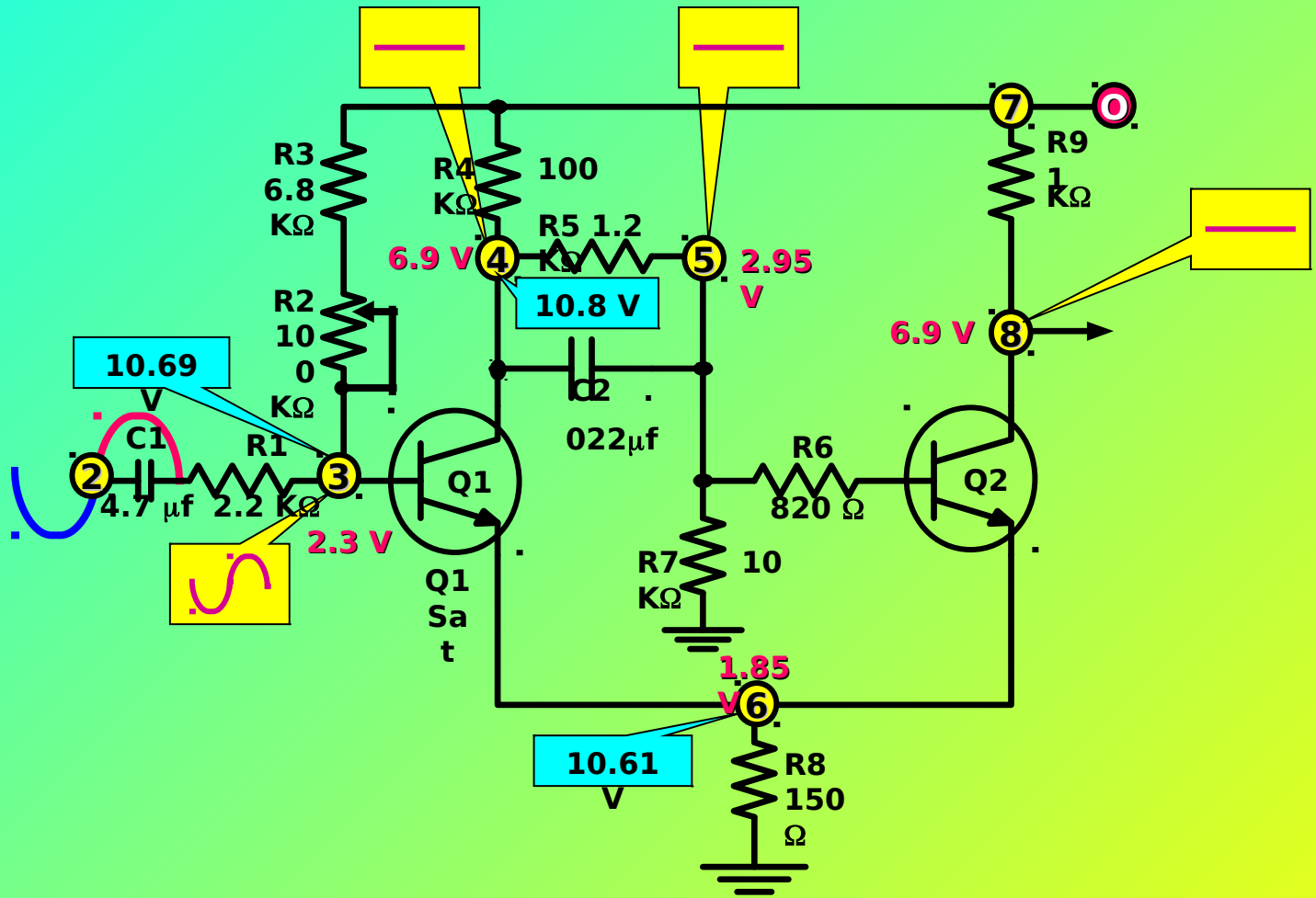
Troubleshooting; Malfunction #1



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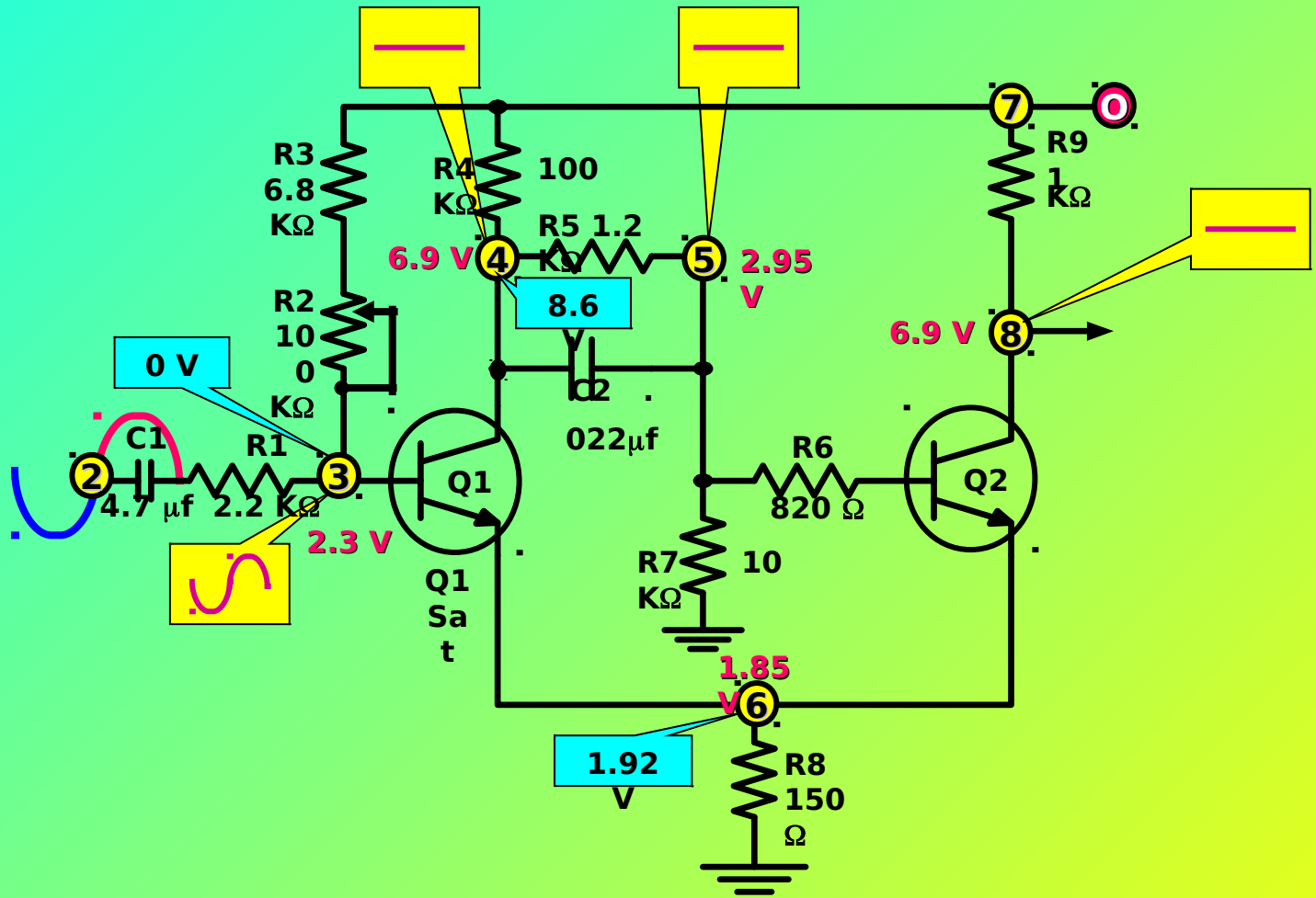
Troubleshooting; Malfunction #2



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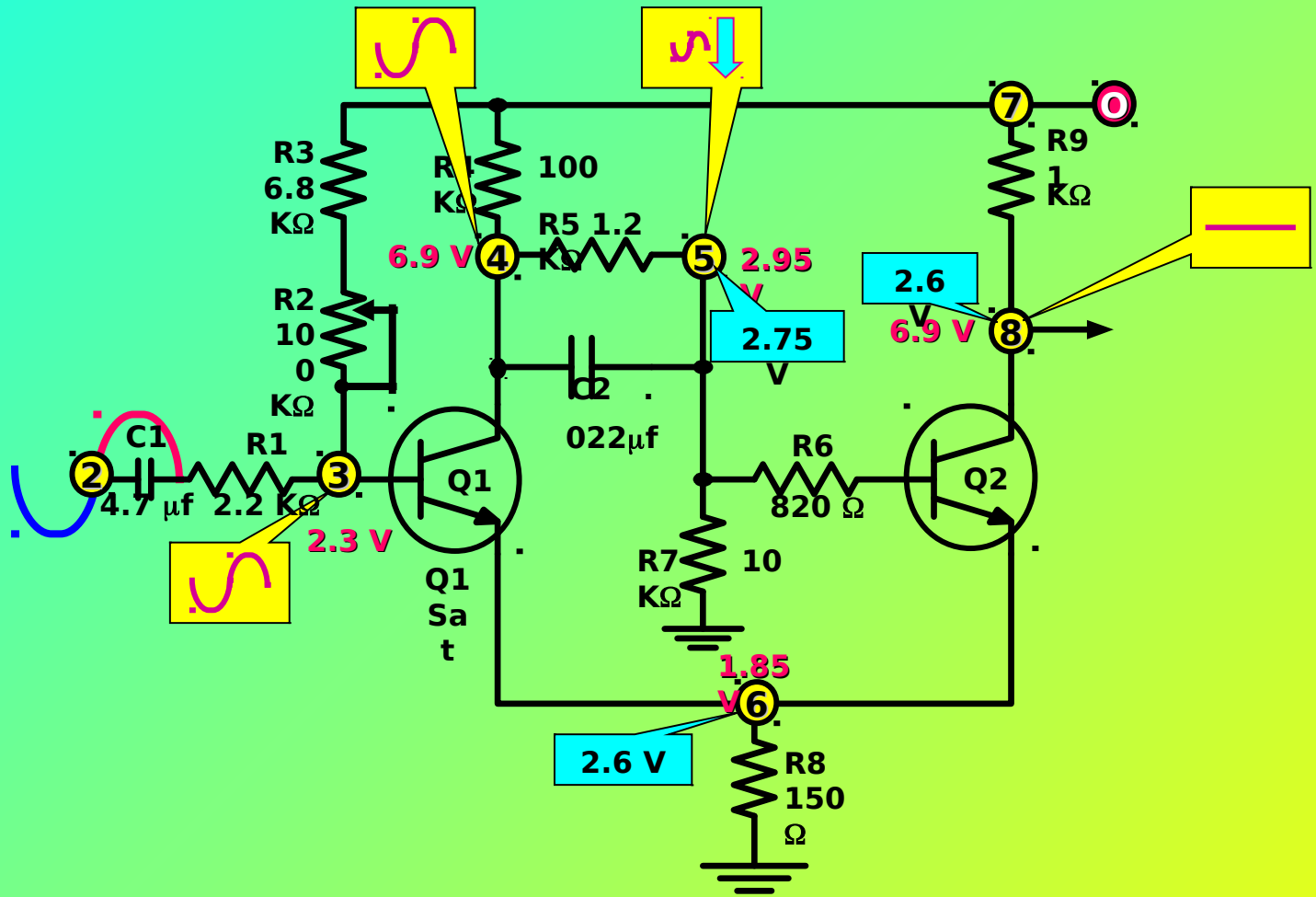
Troubleshooting; Malfunction #3



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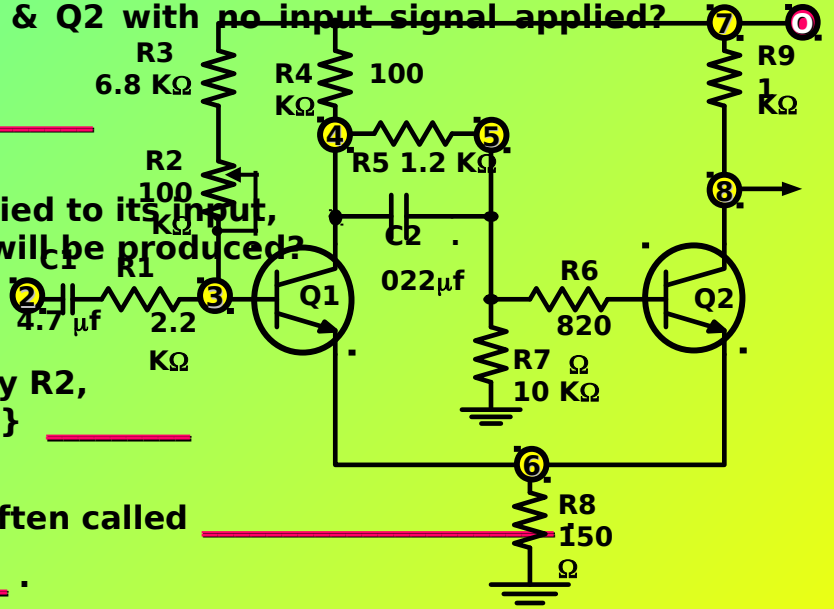
Review Questions; Refer to PC 47 for the following questions.

1. A properly functioning Schmitt Trigger will always produce a _____ output.
2. What is one use for a Schmitt Trigger? _____
3. What open component would cause the collectors of both Q1 & Q2 to have a higher than normal voltage reading? {Both transistors going to cutoff} _____
4. What are the normal operating levels of Q1 & Q2 with no input signal applied? _____.
5. What is the purpose of variable resistor R2? _____
6. If 50 KHz waveform of sufficient amplitude to trigger a Schmitt Trigger is applied to its input, what output frequency will be produced? _____ .
7. As a negative alternation of the input signal falls below the bias level set by R2, Q1 will { Conduct / Cutoff } _____
8. Circuits that provide the reshaping of signals are often called _____
9. What is the purpose of C2? _____ .
10. There is no output, input is good and there is an amplified signal @ TP4, TP8 = 12V, TP5 = Normal. What is a possible Malfunction? _____



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Lesson Test;

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Standard: 10 Questions W/in 20 Minutes. 70% Minimum Accuracy.

Reference: None.